Report on a mussel survey of the River Raisin at Winchester Parkway, Monroe, Michigan

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Summary

A total of 12 species of mussels were found in the vicinity of the Winchester Parkway Bridge. Of these, one is listed as endangered in Michigan (*Obliquaria reflexa*), one is listed as threatened in the state (*Truncilla donaciformis*), and two are species of Special Concern (*Alasmidonta marginata* and *Truncilla truncata*). No federal endangered or threatened species were found in the reach. The reach of river immediately under the bridge potentially supports a mussel community of between 900-1,500 mussels.

Introduction

The objective of this survey was to determine if mussels are located in the vicinity of the Winchester Parkway Bridge. The bridge crosses the River Raisin approximately 4,600 meters upstream of its confluence with Lake Erie. It is approximately 135 meters wide at the bridge and the bridge is located approximately 100 meters upstream of the first low head dam on the river. The water ranges from fairly shallow (under low water conditions) to greater than 4 feet deep under, immediately upstream, and immediately downstream of the bridge. A local fisherman told of being able to walk across the river during the summer low-flow period.

The River Raisin supports a diverse mussel fauna. Mcrae *et al.* (2004) reported that the early literature identified 27 species of mussels in the river, and Mcrae *et al.* (2004) found 21 of these species alive during their study. They concluded mussel diversity was highest in the upper basin and got progressively worse going downstream. Some sites they sampled yielded no living mussels while other sites yielded as many as 12 species of mussels.

Hoggarth (2004, 2005, 2006, 2007a, 2007b, 2008), Hoggarth and Yankie, (2008) and Hoggarth and Thomas (2009) have demonstrated that mussels have returned to Lake Erie and have established sizable communities in the larger rivers that empty into the lake. The Maumee River for example was found to support an impressive mussel fauna composed mostly of species that employ the drum (*Aplodinotus grunniens*) as host for their larvae (glochidia). It appears that as the distribution and abundance of the drum has increased so too has the distribution and abundance of certain mussel species. These species include *T. truncata, T. donaciformis, O. reflexa, Leptodea fragilis*, and *Potamilus alatus*. Three of these are listed species in Michigan: *T. truncata* is Special Concern, *T. donaciformis* is Threatened, and *O. reflexa* is Endangered (MDNR, 2009). In addition, with the exception of *L. fragilis*, none of these species were reported by Mcrae *et al.* (2004) from collections they made in 2000-2001.

Materials and Methods

Mussel shells and live mussels were collected from the shallow water in the vicinity of the Winchester Parkway Bridge on 6-7 June 2009. The river was not low at the time of this study, but low enough to access the banks and some shallow water areas (Figure 1). Shells were gathered from the banks where they were scattered, from muskrat (*Ondatra*

zibethicus) middens, or from the bottom of the river while searching for live mussels. Live mussels were collected by sight or by feel and returned after collecting (in one instance a live specimen of *Lasmigona costata* was collected from a midden, apparently not having been eaten by a muskrat, and quickly returned after being discovered to be alive). Water temperature, conductivity, oxygen concentration, pH, and turbidity were determined using a variety of HACH meters to help assess water quality. In addition, the banks of the river immediately upstream of the project area (to the next dam upstream) were searched for shells in order to determine if other species of mussels might be in the reach that was not found in the primary collecting area. All living mussels (as noted above) and all dead shells were returned to the river's bank after having been identified and counted. Figure 2 shows an aerial photograph of the bridge at this site.

Results

The limited water quality parameters sampled indicate that the river in the vicinity of the bridge is suitable for a large diversity of mussels (Table 1). The conductivity (643 mS/cm) is indicative of a Midwestern stream with high dissolved carbonates, which are important for mussels to make their shells, while the oxygen concentration (8.53 mg/l) and pH (8.26) are suitable for mussels. Turbidity (11.7 NTU) at the time of the survey was acceptable for a visual search for mussels and the temperature of the water was such that mussels extracted from the bottom should have been able to right themselves and move back down into the substrate.

A total of 12 species were found in the vicinity of the bridge (Table 2). Figure 3 shows some of these mussels and Figure 4 shows the bridge. Of these 12 species of mussels found during the current survey, one species (*O. reflexa*) is Endangered in Michigan, one (*T. do*naciformis) is Threatened in the state, and two species (*T. truncata* and *A. marginata*) are of Special Concern. A single specimen of *Toxolasma parvus* (Michigan Endangered) was found upstream near the upstream dam as well. The dominant species in the reach were *Quadrula quadrula, T. truncata, L. costata,* and *T. donaciformis*. Given the number of shells found, the number of live animals seen and collected, and experience with similar types of communities in similar rivers (such as the Maumee River), the reach at the River Raisin in the vicinity of the Winchester Parkway Bridge probably supports 900-1,500 mussels. If these estimates are correct, then the reach would produce 70 specimens of *O. reflexa* as well as many other specimens listed by Michigan (Threatened and Special Concern). It is also likely that some species not found during the current survey in the reach centered on the bridge (like *T. parvus* – found upstream) might be found.

Discussion

The community of mussels (12 species) is similar to the best reaches discovered for the entire river by Mcrae *et al.* (2004). In addition, four of the species found during this study were not reported by the earlier study. It is probably that these species have moved into the lower portion of the river only recently and probably only as high upstream as the second or third low head dam. The first low head dam immediately downstream of the

bridge does not block fish migration as its top is very low. In any event, freshwater drum from Lake Erie have moved into the reach spanned by the Winchester Parkway Bridge (one was caught by a fisherman while we were present on the river) and these fish have brought these mussels with them as they have in the Maumee, and Vermilion rivers, as well as other big rivers in Ohio that drain into Lake Erie and the Ohio River.

Endangered Species

Two Michigan endangered species were found during the current survey: *O. reflexa* was found in the immediate vicinity of the bridge, and *T. parvus* was found upstream near the second dam on the river. In addition to these two species, one Michigan Threatened species was found (*T. donaciformis*) and two Michigan Species of Concern were found (*A. marginata* and *T. truncata*). No federal endangered or threatened species of mussels were found. Mcrae *et al.* (2004) note that *Villosa fabalis* (candidate species for federal listing as endangered) had been reported from the river, but the species has not been found recently in the river. Other species listed by Michigan that occur in the watershed (Mcrae *et al.*, 2004), but not found during the current study are *Alasmidonta viridis* (Threatened – a headwaters species), *Cyclonaias tuberculata* (Threatened – possibly in this reach), *Lampsilis fasciola* (Threatened – possibly in this reach), *Ligumia recta* (Endangered – possibly in this reach), *Pleurobema sintoxia* (Special Concern – possibly in this reach), *Ptychobranchus fasciolaris* (Threatened – possibly in this reach), *Venustaconcha ellipsiformis* (Special Concern – a headwaters species), and *Villosa iris* (Threatened – possibly in this reach).

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Table 1. Water quality readings for the River Raisin at the Winchester Parkway Bridge in Monroe, Michigan on 6 June 2009.

Parameter	Value	Units
Water temperature	19.9	°C
pH	8.26	
Oxygen	8.53	mg/l
Turbidity	11.7	NTU
Conductivity	643	uS/cm

Table 2. Mussels collected from the River Raisin at the Winchester Parkway Bridge in Monroe, Michigan on 6-7 June 2009.

	Species	Abundance	% of total
1.	*Pyganodon grandis*	2	0.01
2.	*Alasmidonta marginata*[a]	1	0.01
3.	*Lasmigona costata*	11	0.06
4.	*Amblema plicata*	13	0.07
5.	*Quadrula quadrula*	79	0.41
6.	*Quadrula pustulosa*	2	0.01
7.	*Leptodea fragilis*	1	0.01
8.	*Potamilus alatus*	3	0.02
9.	*Truncilla truncata*[a]	55	0.29
10.	*Truncilla donaciformis*[b]	8	0.04
11.	*Obliquaria reflexa*[c]	13	0.07
12.	*Lampsilis r. luteola*	3	0.02
Total		191	5/m^2

a – Special Concern, b – Threatened, c – Endangered

Note – a specimen of *Toxolasma parvus* (Endangered) was found upstream within the potential relocation area

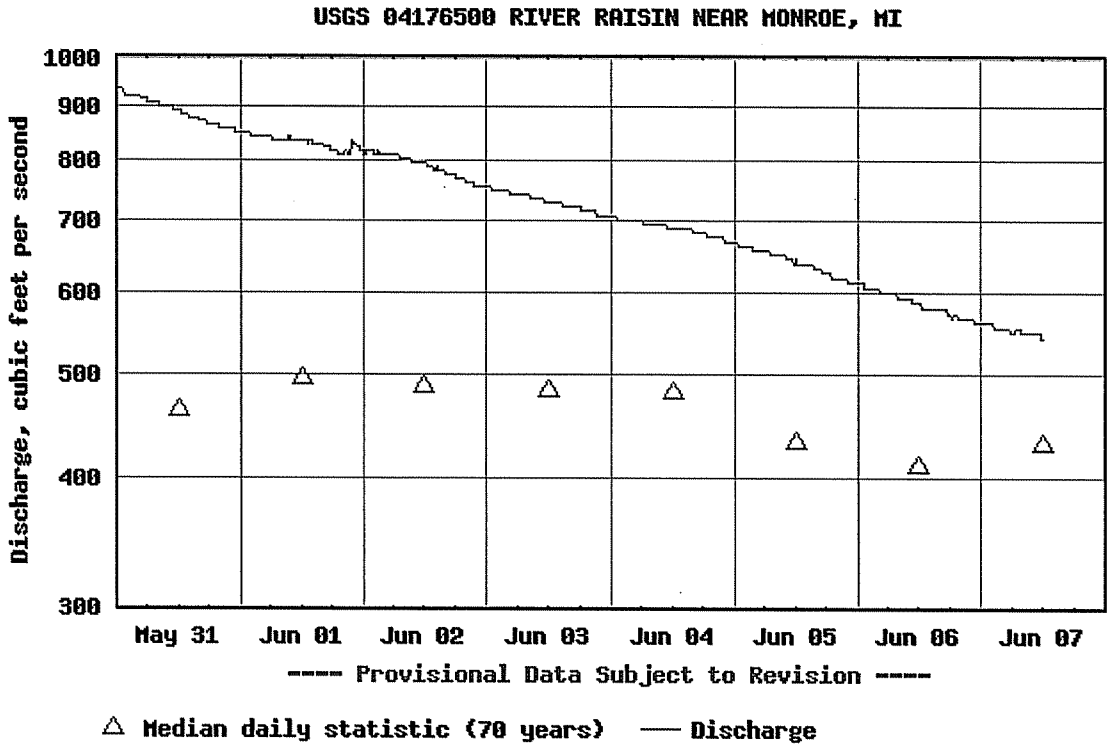

Figure 1. USGS flow data for the River Raisin during the time of this survey, 6-7 June 2009.

Figure 2. Aerial photograph of the project area from Google Earth.

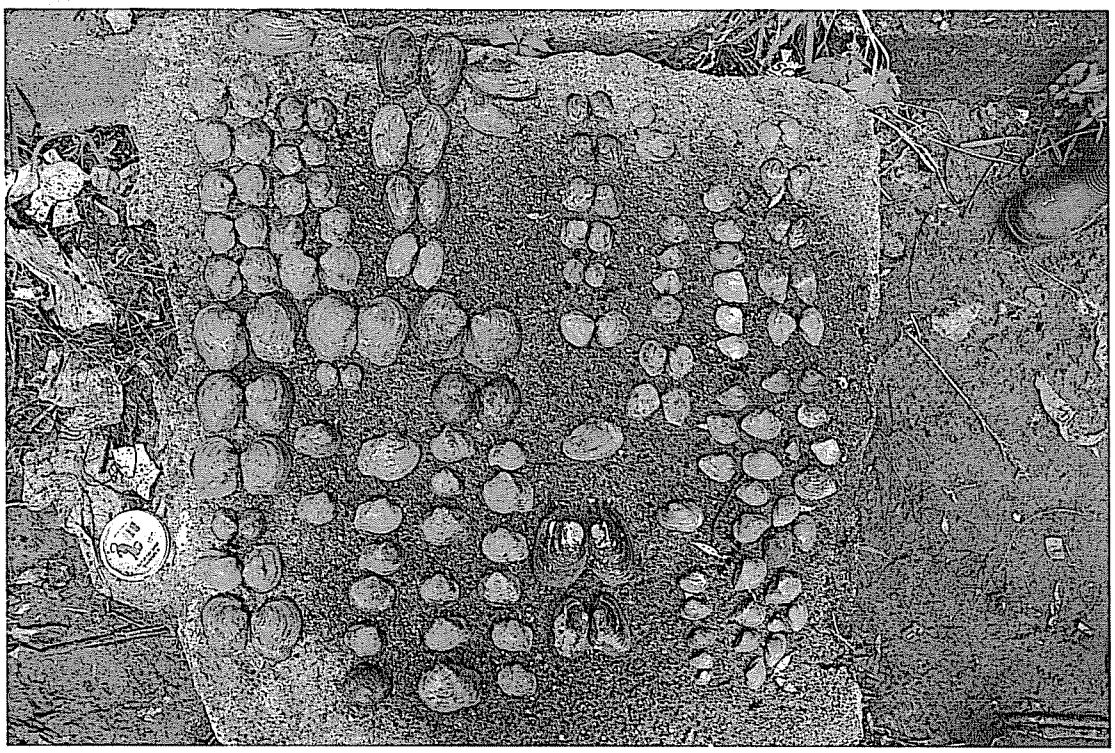

Figure 3. Some of the mussels collected from the River Raisin near the Winchester Parkway Bridge in Monroe, Michigan.

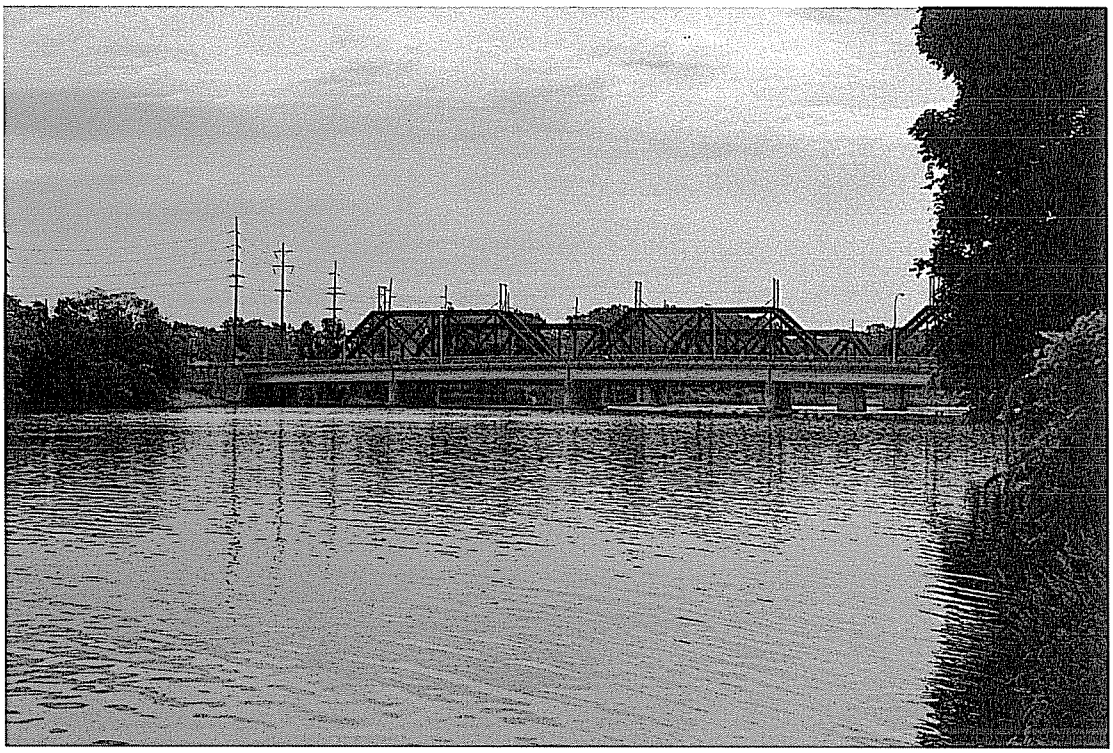

Figure 4. The Winchester Parkway Bridge in Monroe, Michigan.